"Wallin, Sharon"
<WallinSL@cdm.com>
07/16/2007 10:18 AM

To Christopher Lichens/R9/USEPA/US@EPA
cc <LParnass@dtsc.ca.gov>, <tperina@ch2m.com>, <edm@demaximis.com>, "Chamberlin, David" <ChamberlinDC@cdm.com>, "Lavelle, James"
bcc
Subject RE: Submittal of Tech Memo for Additional Ambient Air Analysis Requested by USEPA

History: This message has been forwarded.

Chris - Attachment 3 was inadvertently duplicated in last Friday's submittal (and attached as Attachment 2). Here's the correct Attachment 2 (RBCA output). Sorry for any confusion.

Regards,

Sharon Wallin, P.G.
CDM
18581 Teller Ave., Suite 200
Irvine, CA 92612

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<<Attachment A-2 RBCA.pdf>>

From: Wallin, Sharon
Sent: Friday, July 13, 2007 5:03 PM
To: lichens.christopher@epamail.epa.gov
Cc: LoriParnass (LParnass@dtsc.ca.gov); TomPerina (tperina@ch2m.com); edm@demaximis.com; Chamberlin, David; Lavelle, James; Tzou, Kassandra

Subject: Submittal of Tech Memo for Additional Ambient Air Analysis Requested by USEPA

Hi Chris - the attached documents provide the additional information requested by USEPA at the June 28th meeting regarding USEPA comments to the Human Health Risk Assessment Report for On-Site Soils for the Omega Chemcial Superfund Site. If you have any questions regarding the attached, please feel free to call.

Regards,

Sharon Wallin, P.G.
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<< File: Attachment A-1.pdf >> << File: Attachment A-2 Site Resident Omega_SG-ADV-Feb04_Example PCE.pdf >> << File: Attachment A-3 Site Resident Omega_SG-ADV-Feb04_Example PCE.pdf >> << File: Omega TM Ambient Air3 (3) (2).doc >>

Attachment A-2 RBCA.pdf

Attachment A-2

PCE Example of RBCA Tool Kit Spreadsheet Model

Main Screen

RBCA Tool Kit for Chemical Releases
Version 1.2 © 1999

1. Project Information

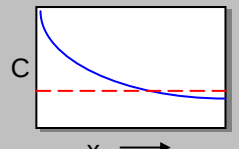
Site Name:	Omega Chemical Site		
Location:	Whittier, CA		
Compl. By:	K. Tzou		
Date:	12-Jul-07	Job ID:	

2. Which Type of RBCA Analysis? ?

◉ **Tier 1**

Generic Values
On-Site
Exposure

○ **Tier 2**



Site-Specific Values

On- or Off-Site Exposure

3. Calculation Options ?

Affects which input data are required

☑ ***Baseline Risks (Forward mode)***

☑ ***RBCA Cleanup Standards (Backward mode)***

4. RBCA Evaluation Process

Prepare Input Data

Data Complete? (■ = yes, ■ = no)

- ■ □ **Exposure Pathways**
- ↓
- ■ □ **Constituents of Concern (COCs)**
- ↓
- ■ □ **Transport Models**
- ↓
- ■ □ **Soil Parameters**
- ↓
- **GW Parameters**
- ↓
- ■ □ **Air Parameters**

Review Output

- **Exposure Flowchart**
- **COC Chem. Parameters**
- **Input Data Summary**
- **User-Spec. COC Data...**
- **Transient Domenico Analysis...**
- **Baseline Risks...**
- **Cleanup Standards...**

5. Commands and Options

New Site	**Load Data...**	**Save Data As...**	**Quit**
Print Sheet	**Set Units**	Custom Chem. Data...	***Help***

Site Name: Omega Chemical Site | Job ID:
Location: Whittier, CA | Date: 12-Jul-07
Compl. By: K. Tzou

Commands and Options

Main Screen | Print Sheet | *Help*

Source Media Constituents of Concern (COCs)

Apply Raoult's Law ?

Selected COCs

COC Select: | *Sort List:* ?

Add/Insert | Top | MoveUp
Delete | Bottom | MoveDown

Tetrachloroethene

Representative COC Concentration ?

Groundwater Source Zone

Calculate | Enter Site Data

(mg/L)	note

Soil Source Zone

Calculate | Enter Site Data

(mg/kg)	note
5.1E+2	

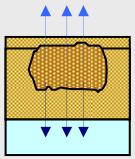
Mole Fraction in Source Material ?

(-)

Transport Modeling Options

Site Name: Omega Chemical Site | Job ID:
Location: Whittier, CA | Date: 12-Jul-07
Compl. By: K. Tzou

1. Vertical Transport, Surface Soil Column



Outdoor Air Volatilization Factors ?

- ○ Surface soil volatilization model only
- ◉ Combination surface soil/Johnson & Ettinger models
  Thickness of surface soil zone: 914 *(cm)*
- ○ User-specified VF from other model — Enter VF Values

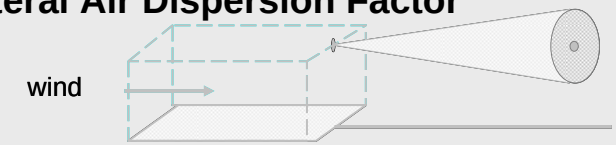
Indoor Air Volatilization Factors ?

- ○ Johnson & Ettinger model
- ○ User-specified VF from other model — Enter VF Values

Soil-to-Groundwater Leaching Factor

- ○ ASTM Model ?
  - ☐ Apply Soil Attenuation Model (SAM)
  - ☐ Allow first-order biodecay — Enter Decay Rates
- ○ User-specified LF from other model — Enter LF Values

2. Lateral Air Dispersion Factor

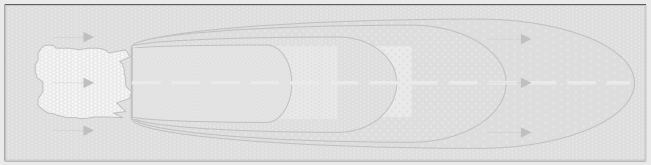


?

- ○ 3-D Gaussian dispersion model
- ○ User-Specified ADF

Off-site 1	Off-site 2	
1.00E+0	1.00E+0	*(-)*

3. Groundwater Dilution Attenuation Factor



Calculate DAF using Domenico Model ?

- ○ Domenico equation with dispersion only (no biodegradation)
- ○ Domenico equation first-order decay — Enter Decay Rates
- ○ Modified Domenico equation using electron acceptor superposition — Enter Site Data

Enter Directly — Biodegradation Capacity: NC *(mg/L)*

— or —

User-Specified DAF Values

- ○ DAF values from other model or site data — Enter DAF Values

n o

4. Commands and Options

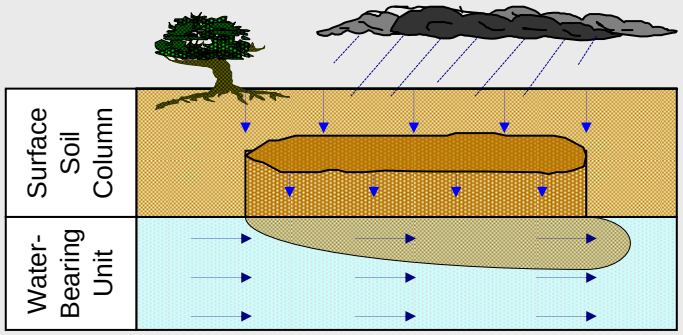
Main Screen | **Print Sheet** | ***Help***

Site-Specific Soil Parameters

Site Name: Omega Chemical Site | Job ID:
Location: Whittier, CA | Date: 12-Jul-07
Compl. By: K. Tzou

1. Soil Source Zone Characteristics

	General Case	Construction	
Hydrogeology			
Depth to water-bearing unit			(cm)
Capillary zone thickness			(cm)
Surface soil column thickness			(cm)
Affected Soil Zone			
Depth to top of affected soils	152.4		(cm)
Depth to base of affected soils	914.4		(cm)
Affected soil area	4E+07	4E+07	(cm)
Length of affected soil parallel to assumed wind direction	6361	6361	(cm)
Length of affected soil parallel to assumed GW flow direction			(cm)



2. Surface Soil Column

	Vadose Zone	Capillary Fringe	
Predominant USCS Soil Type			ults
or Calculate	*or*		
Total porosity	0.399		(-)
Volumetric water content	0.148	0.332	(-)
Volumetric air content	0.251	0.067	(-)
Dry bulk density	1.59		(kg/L)
Vertical hydraulic conductivity	1.2E+1		(cm/d)
Vapor permeability	1.6E-9		(cm^2)
Capillary Zone Thickness	3.8E+1		(cm)
Net Rainfall Infiltration			
Net infiltration estimate			(cm/yr)
or NA	*or*		
Average annual precipitation			(cm/yr)
Partitioning Parameters			
Fraction organic carbon	0.002		(-)
Soil/water pH	6.8		(-)

3. Commands and Options

Main Screen | Use Default Values | Print Sheet
Set Units | | *Help*

Site-Specific Air Parameters

Site Name: Omega Chemical Site | Job ID:
Location: Whittier, CA | Date: 12-Jul-07
Compl. By: K. Tzou

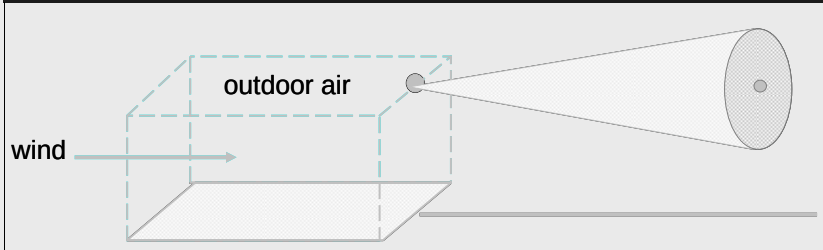
1. Outdoor Air Pathway

Dispersion in Air

	Off-site 1	Off-site 2	
Distance to offsite air receptor			*(cm)*
or NA		*or*	
Horizontal dispersivity			*(cm)*
Vertical dispersivity			*(cm)*

Air Source Zone

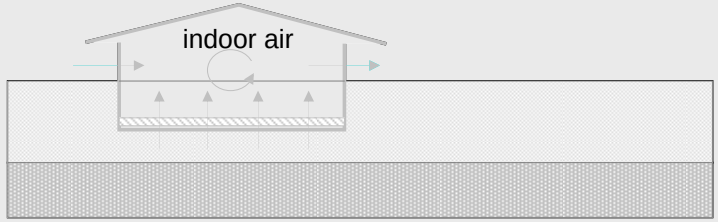
Air mixing zone height	200	*(cm)*
Ambient air velocity in mixing zone	33	*(cm/s)*
Areal particulate emission flux	6.9E-14	*(g/cm^2/s)*



2. Indoor Air Pathway

Building Parameters

	Residential	Commercial	
Building volume/area ratio	200	300	*(cm)*
Foundation area	700000	700000	*(cm^2)*
Foundation perimeter	3400	3400	*(cm)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	15	15	*(cm)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(cm^3/s)*
Foundation thickness	15		*(cm)*
Foundation crack fraction	0.01		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*



3. Commands and Options

Main Screen | Use Default Values | Print Sheet
Set Units | | *Help*

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

SURFACE SOILS (152 - 914 cm):

VAPOR INHALATION

	1) Source Medium	2) NAF Value (m^3/kg) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Soil Conc. (mg/kg)	On-site (0 cm) Com./Constr.	Off-site 1 (0 cm) NA	Off-site 2 (0 cm) NA	On-site (0 cm) Com./Constr.	Off-site 1 (0 cm) NA	Off-site 2 (0 cm) NA
Tetrachloroethene	5.1E+2	6.7E+2			7.5E-1		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

SURFACE SOILS (152 - 914 cm):

VAPOR INHALATION (cont'd)

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)				5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)			
	On-site (0 cm)		Off-site 1 (0 cm)	Off-site 2 (0 cm)	On-site (0 cm)		Off-site 1 (0 cm)	Off-site 2 (0 cm)
Constituents of Concern	Commercial	Construction Worker	NA	NA	Commercial	Construction Worker	NA	NA
Tetrachloroethene	6.8E-1	4.9E-1			5.2E-1	3.7E-1		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAY IS ACTIVE)**

SUBSURFACE SOILS (914 - 914 cm):

VAPOR INHALATION

	1) Source Medium	2) NAF Value (m^3/kg) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Soil Conc. (mg/kg)	On-site (0 cm) Commercial	Off-site 1 (0 cm) NA	Off-site 2 (0 cm) NA	On-site (0 cm) Commercial	Off-site 1 (0 cm) NA	Off-site 2 (0 cm) NA
Tetrachloroethene	5.1E+2	6.7E+2					

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

SUBSURFACE SOILS (914 - 914 cm):

VAPOR INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 cm)	Off-site 1 (0 cm)	Off-site 2 (0 cm)	On-site (0 cm)	Off-site 1 (0 cm)	Off-site 2 (0 cm)
	Commercial	NA	NA	Commercial	NA	NA
Tetrachloroethene	6.8E-1			#VALUE!		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ☐ **(CHECKED IF PATHWAY IS ACTIVE)**

GROUNDWATER: VAPOR INHALATION

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 cm)	Off-site 1 (0 cm)	Off-site 2 (0 cm)	On-site (0 cm)	Off-site 1 (0 cm)	Off-site 2 (0 cm)
		None	NA	NA	None	NA	NA
Tetrachloroethene							

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 cm)	Off-site 1 (0 cm)	Off-site 2 (0 cm)	On-site (0 cm)	Off-site 1 (0 cm)	Off-site 2 (0 cm)
	None	NA	NA	None	NA	NA
Tetrachloroethene						

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

TOTAL PATHWAY EXPOSURE (mg/m^3)

(Sum average expsosure concentrations from soil and groundwater routes.)

	On-site (0 cm)		Off-site 1 (0 cm)	Off-site 2 (0 cm)
Constituents of Concern	Commercial	Construction Worker	NA	NA
Tetrachloroethene	5.2E-1	3.7E-1		

Site Name: Omega Chemical Site
Site Location: Whittier, CA
Completed By: K. Tzou

Date Completed: 12-Jul-07
Job ID:

RBCA SITE ASSESSMENT

TIER 1 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAYS ARE ACTIVE)**

CARCINOGENIC RISK

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Exposure (mg/m^3)				(3) Inhalation Unit Risk Factor (µg/m^3)^-1	(4) Individual COC Risk (2) x (3) x 1000			
		On-site (0 cm)		Off-site 1 (0 cm)	Off-site 2 (0 cm)		On-site (0 cm)		Off-site 1 (0 cm)	Off-site 2 (0 cm)
		Commercial	Construction Worker	NA	NA		Commercial	Construction Worker	NA	NA
Tetrachloroethene	C-B2	5.2E-1	3.7E-1			5.8E-7	3.0E-4	2.2E-4		
Total Pathway Carcinogenic Risk =							**3.0E-4**	**2.2E-4**		

Site Name: Omega Chemical Site
Site Location: Whittier, CA

Completed By: K. Tzou
Date Completed: 12-Jul-07

Job ID:

RBCA SITE ASSESSMENT

TIER 1 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ **(CHECKED IF PATHWAYS ARE ACTIVE)**

TOXIC EFFECTS

Constituents of Concern	(5) Total Toxicant Exposure (mg/m^3) On-site (0 cm) Commercial	(5) Total Toxicant Exposure (mg/m^3) On-site (0 cm) Construction Worker	(5) Total Toxicant Exposure (mg/m^3) Off-site 1 (0 cm)	(5) Total Toxicant Exposure (mg/m^3) Off-site 2 (0 cm)	(6) Inhalation Reference Conc. (mg/m^3)	(7) Individual COC Hazard Quotient (5) / (6) On-site (0 cm) Commercial	(7) Individual COC Hazard Quotient (5) / (6) On-site (0 cm) Construction Worker	(7) Individual COC Hazard Quotient (5) / (6) Off-site 1 (0 cm)	(7) Individual COC Hazard Quotient (5) / (6) Off-site 2 (0 cm)
			NA	NA				NA	NA
Tetrachloroethene	5.2E-1	3.7E-1			3.5E-2	1.5E+1	1.1E+1		
Total Pathway Hazard Index =						**1.5E+1**	**1.1E+1**		

Site Name: Omega Chemical Site
Site Location: Whittier, CA

Completed By: K. Tzou
Date Completed: 12-Jul-07

Job ID: